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(54) **ORGANIC LIGHT EMITTING DIODE (OLED) DISPLAY PANEL AND ELECTRONIC DEVICE**

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H01L 27/32 (2006.01)

(52) **U.S. Cl.**
CPC ***H01L 51/56*** (2013.01); ***H01L 27/3234*** (2013.01); *H01L 2251/301* (2013.01); *H01L 2251/5338* (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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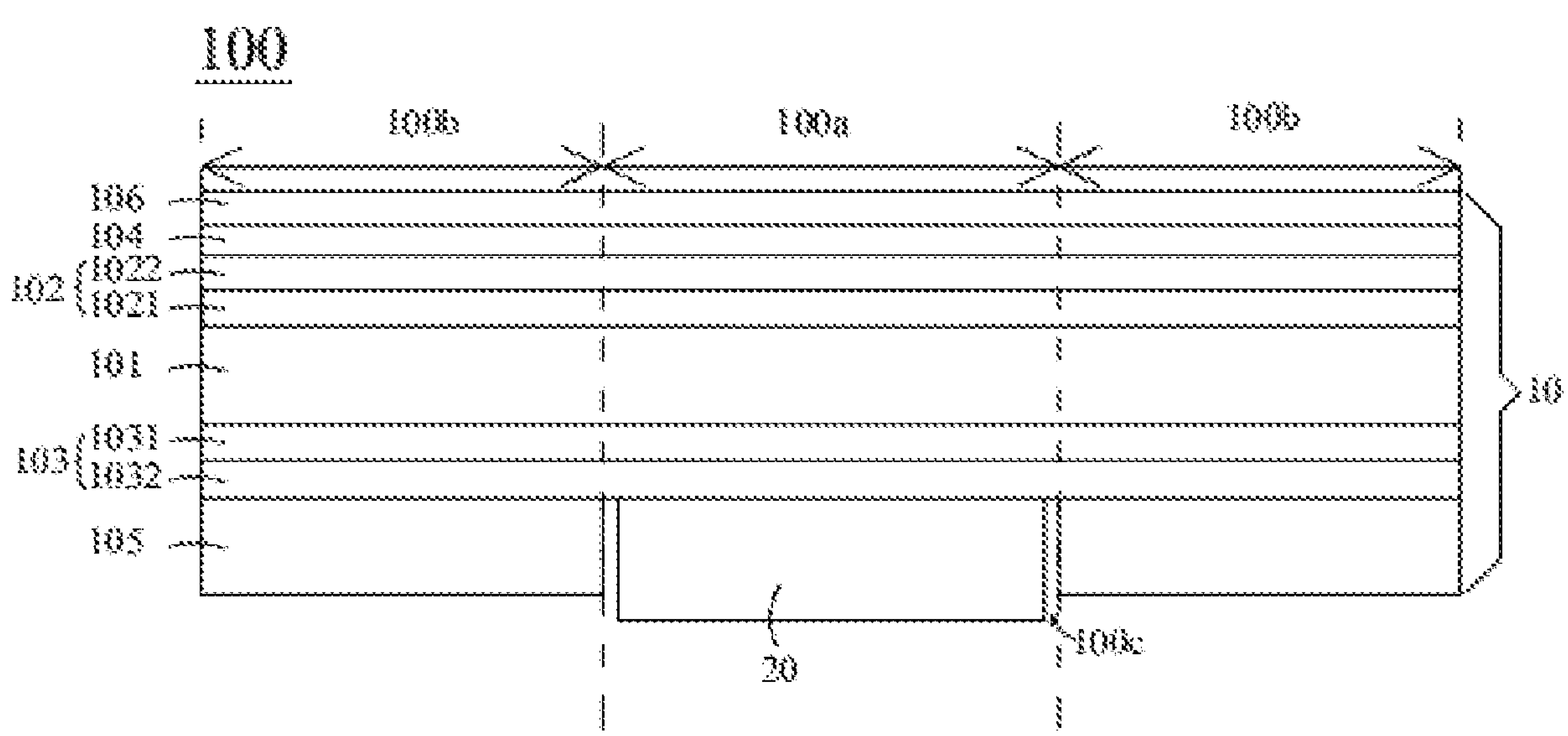
(57) **ABSTRACT**

An organic light emitting diode (OLED) display panel and an electronic device are provided. The OLED display panel includes a flexible polymer substrate, a first inorganic layer, a second inorganic layer, and an OLED array layer; the first inorganic layer and the second inorganic layer formed over opposite surfaces of the flexible polymer substrate, and the OLED array layer formed on a side of the first inorganic layer away from the flexible polymer substrate.

13 Claims, 4 Drawing Sheets



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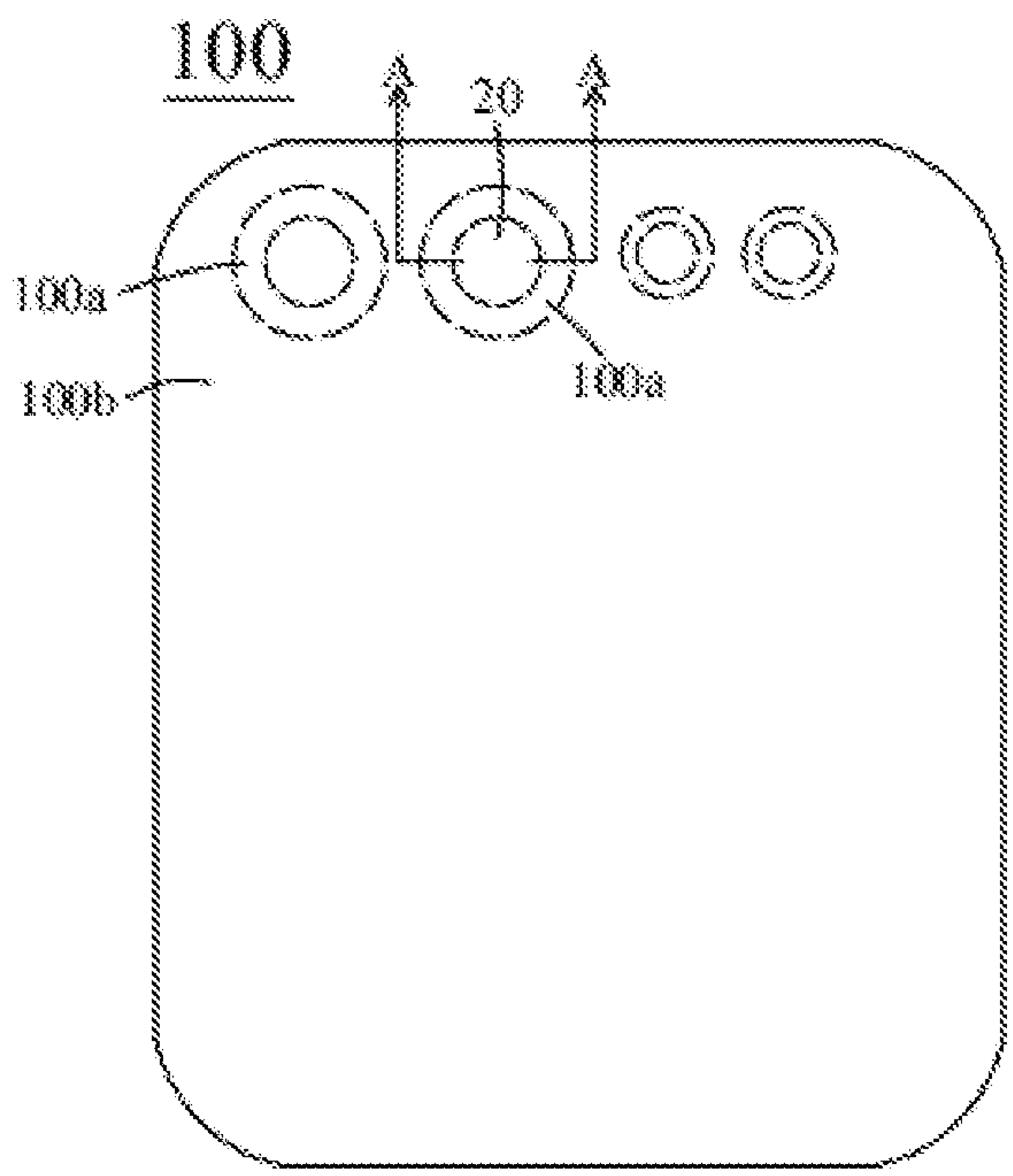
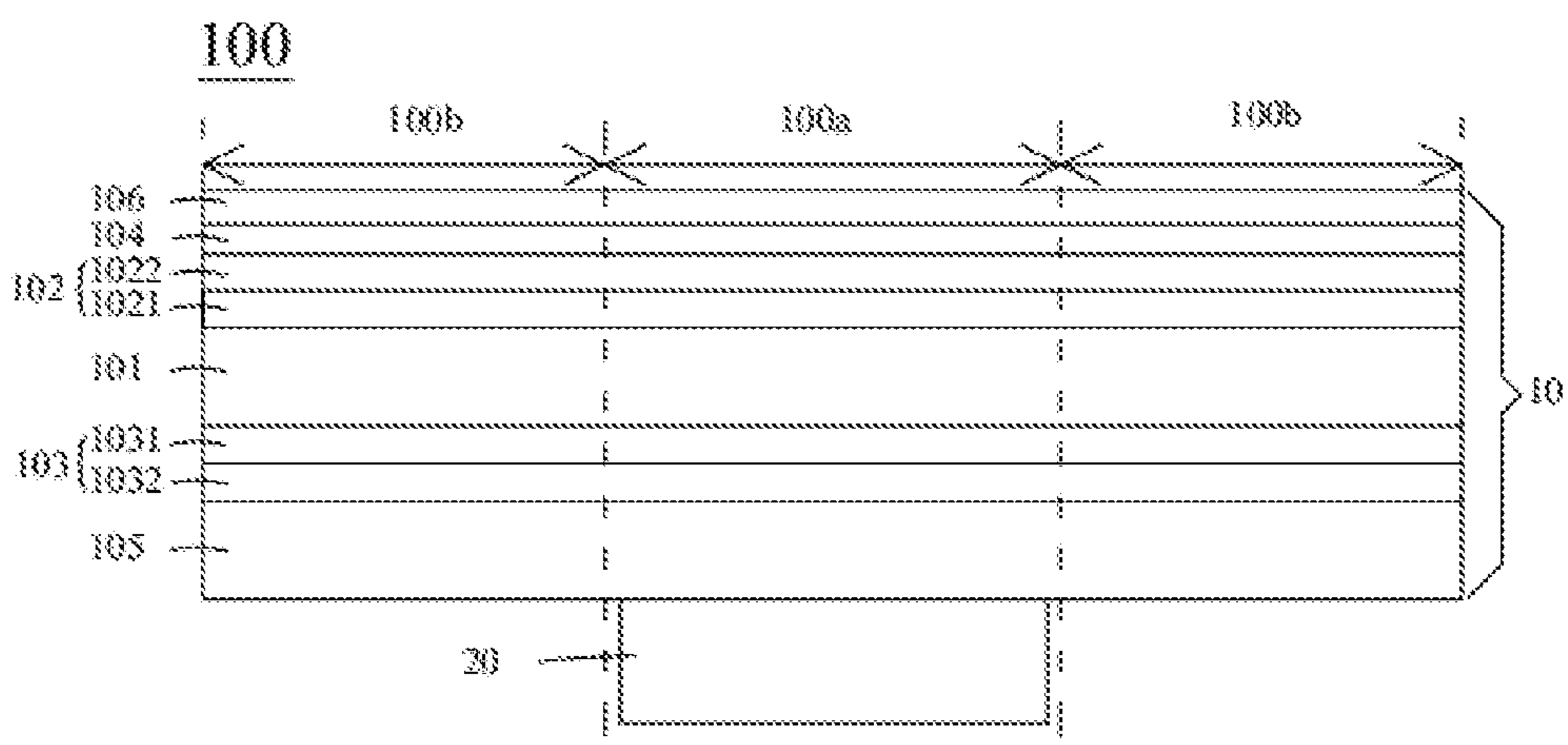

100
A
20
A
100a
100a
100b

FIG. 1


100
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106
104
102
1022
1021
101
103
1031
1032
105
10
20

FIG. 2

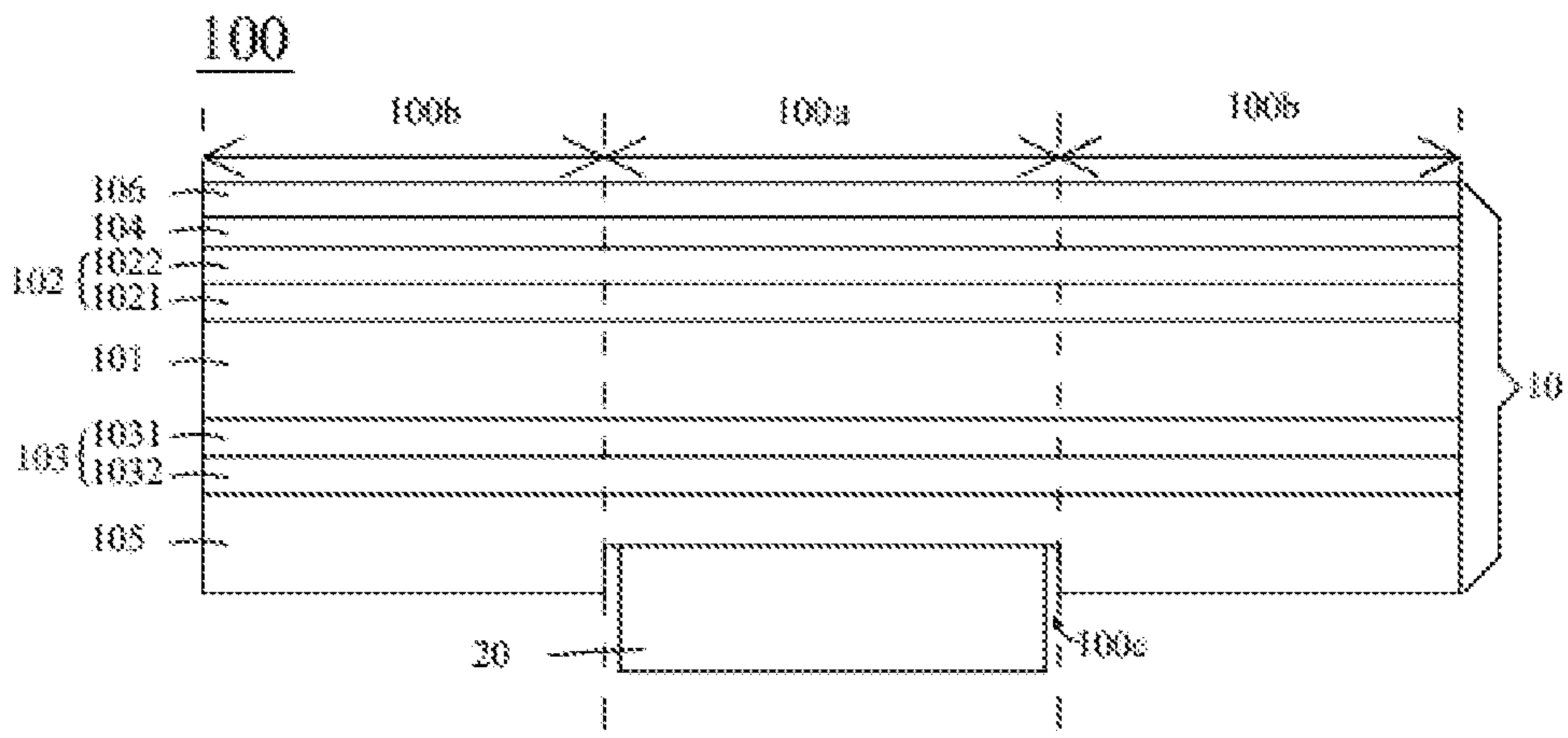
100
100b
100a
100b
106
104
102
1022
1021
101
103
1031
1032
105
10
20
100c

FIG. 3

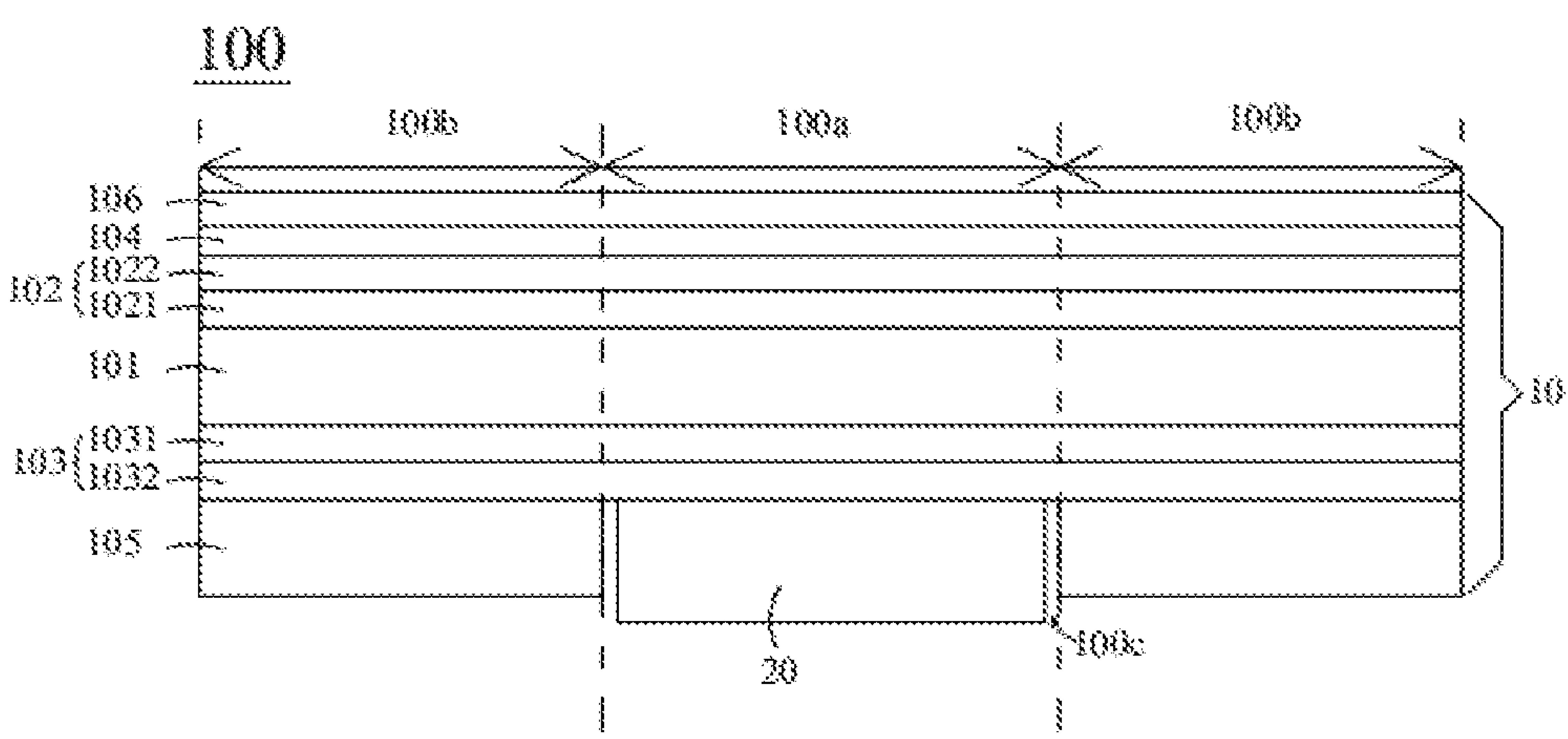
100
100b
100a
100b
106
104
102
1022
1021
101
103
1031
1032
105
10
20
100c

FIG. 4

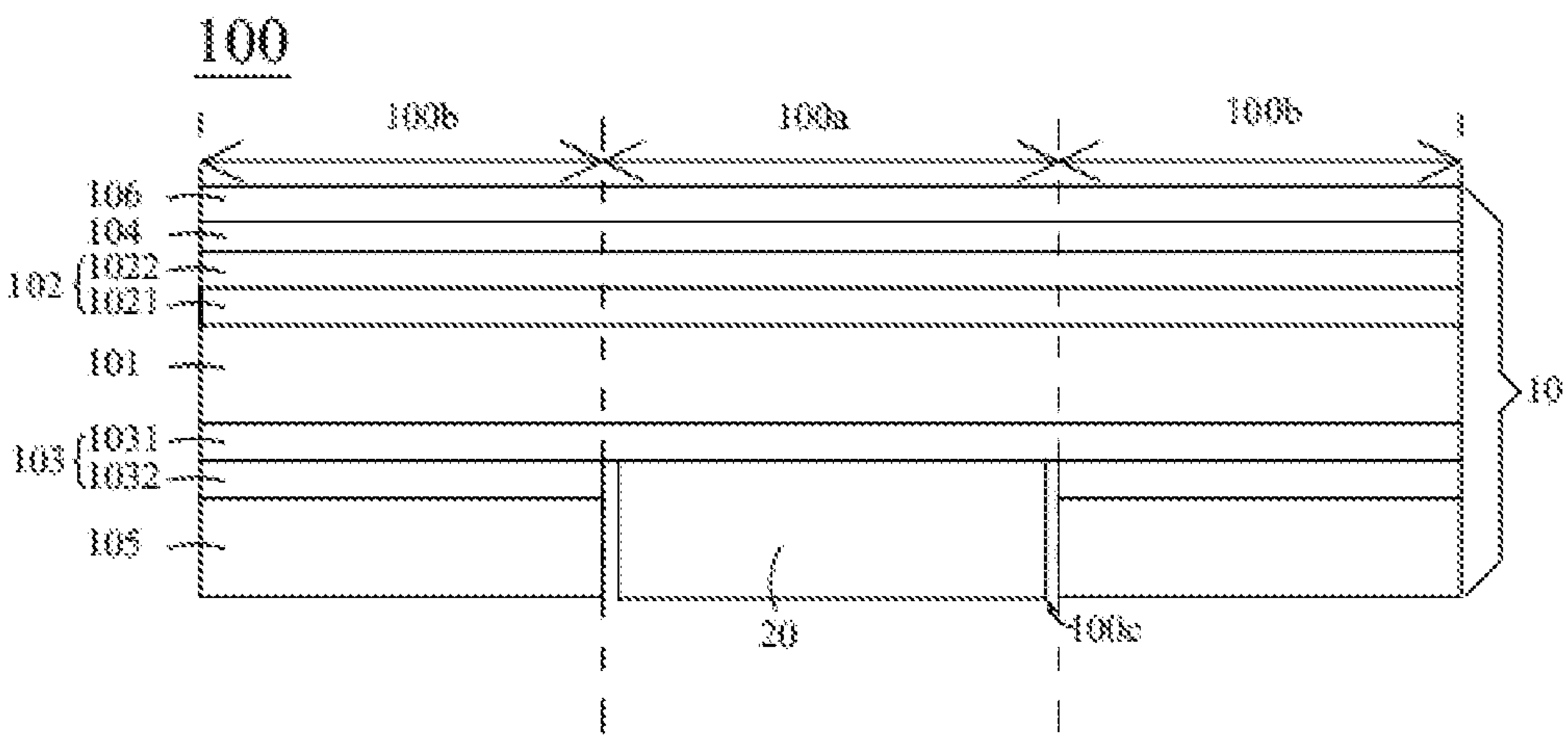
100
100b
100a
100b
106
104
102
1022
1021
101
103
1031
1032
105
20
100c
10

FIG. 5

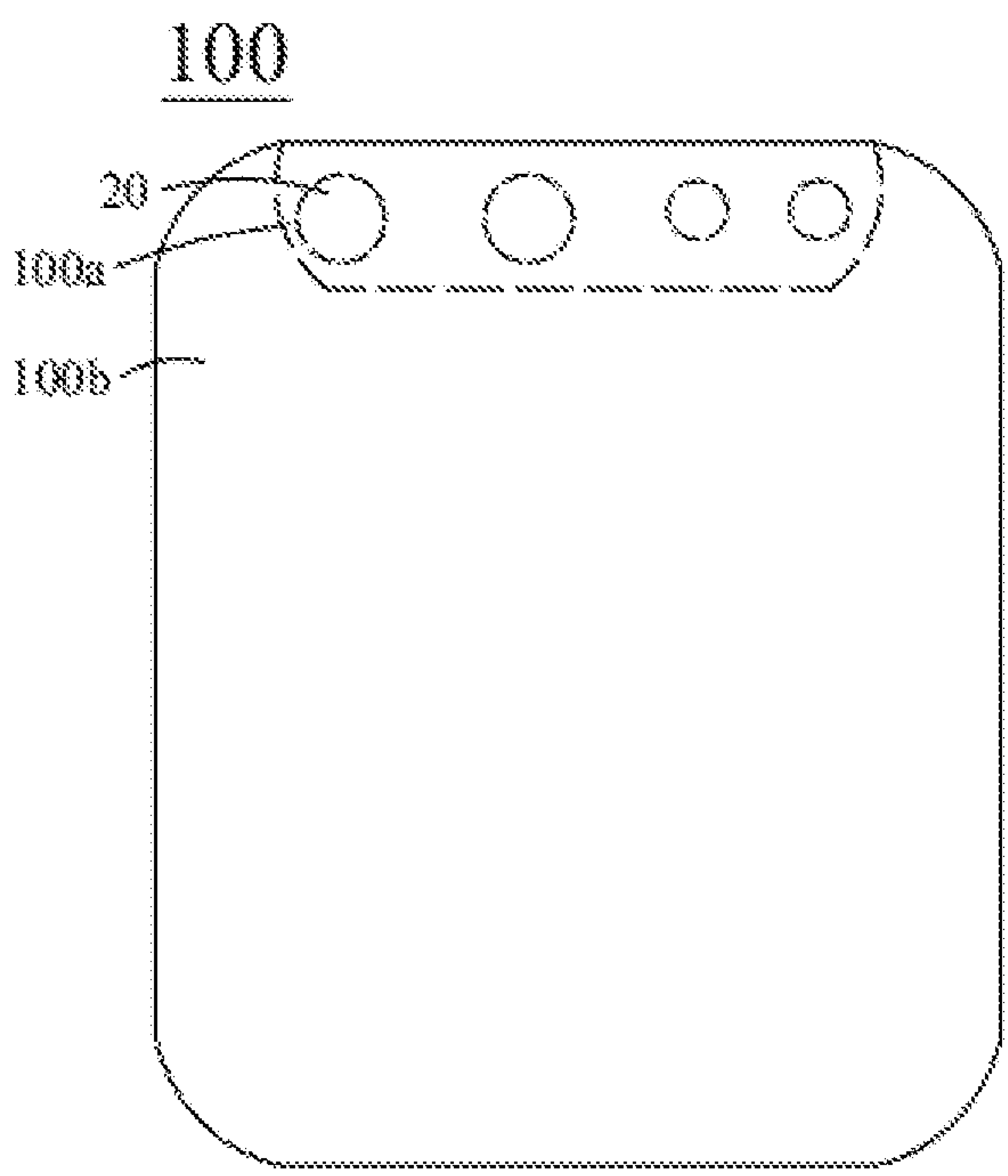
100
20
100a
100b

FIG. 6

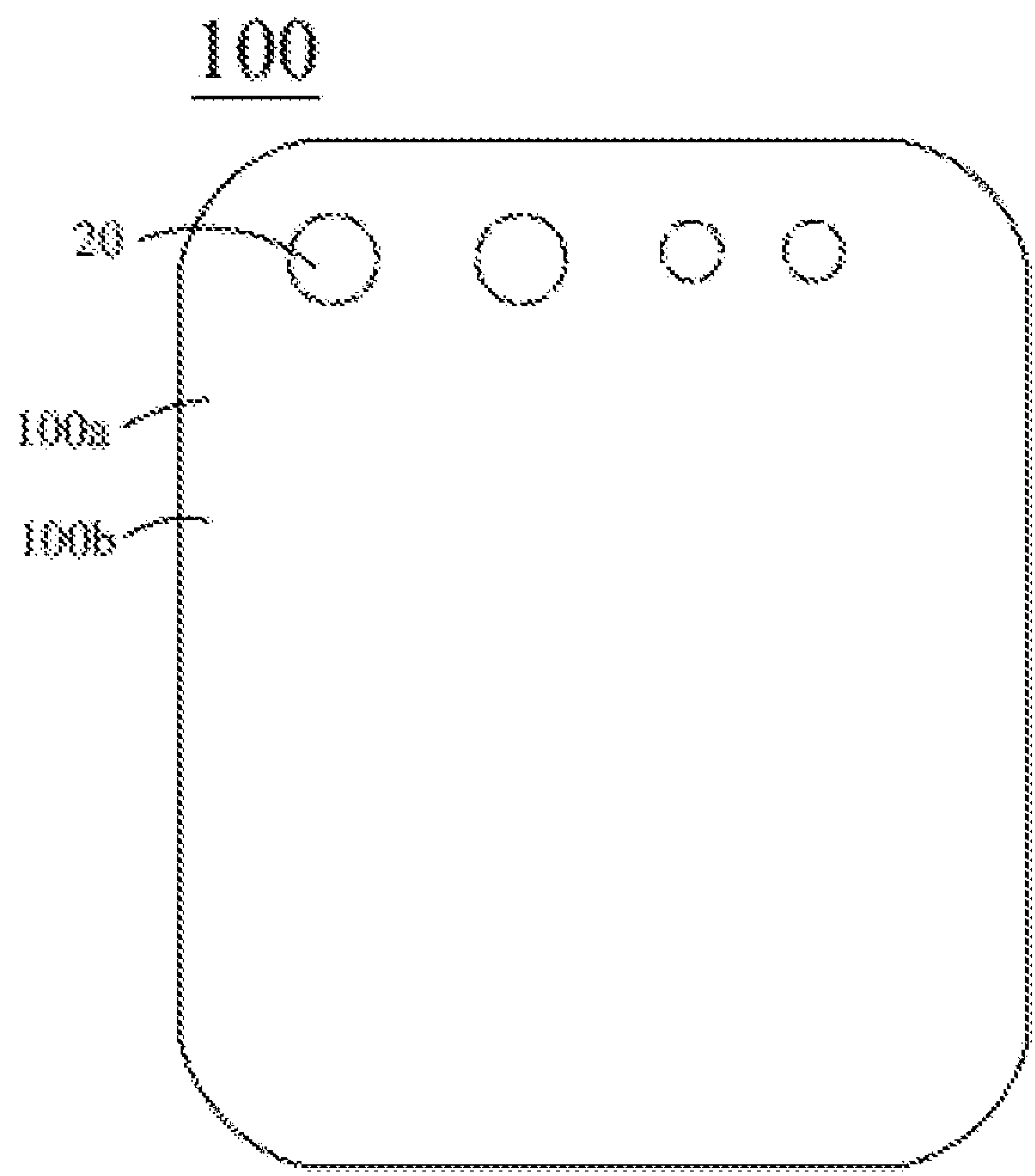

FIG. 7

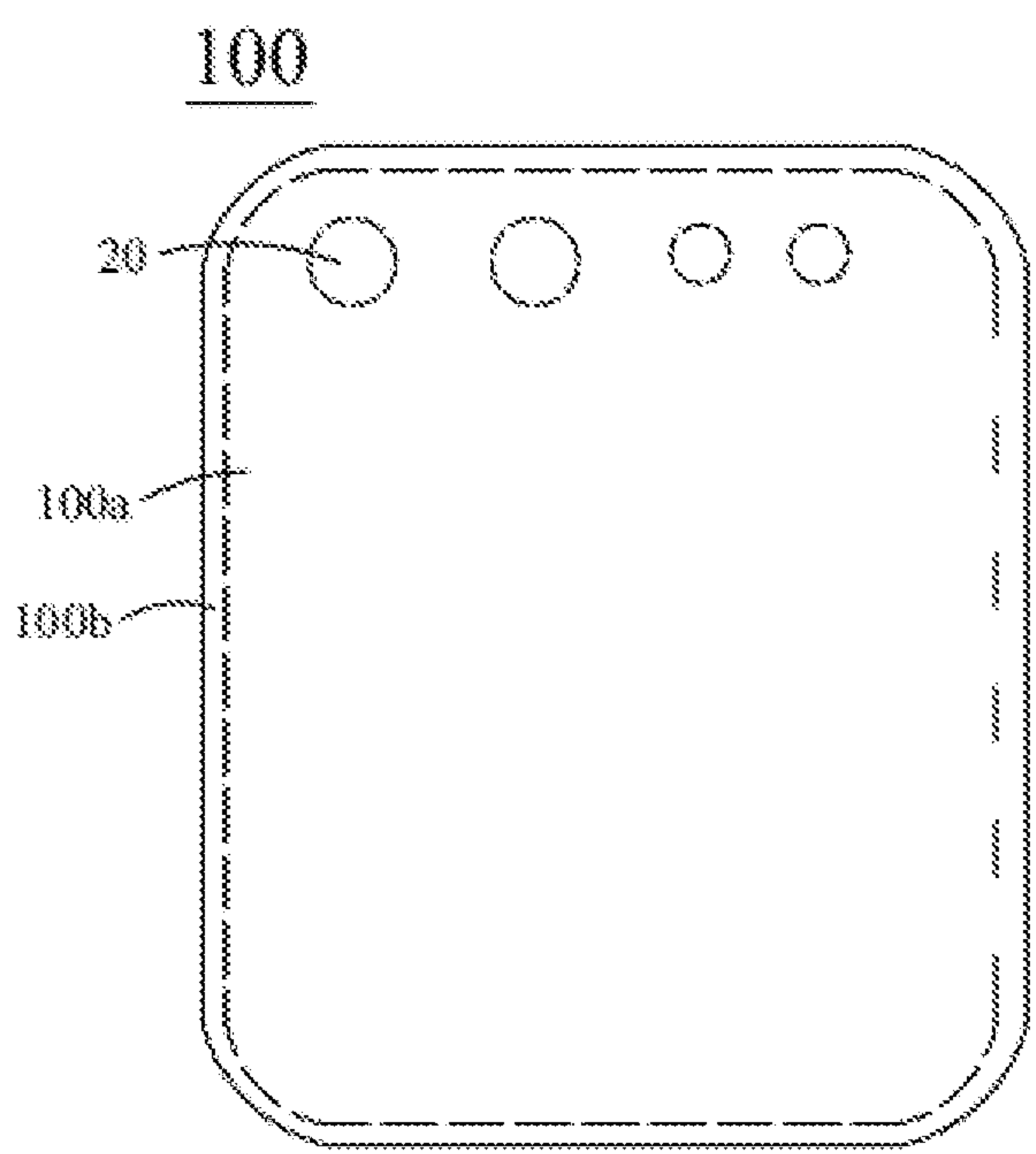

FIG. 8

ORGANIC LIGHT EMITTING DIODE (OLED) DISPLAY PANEL AND ELECTRONIC DEVICE

FIELD OF INVENTION

The present application relates to the field of display technologies, and in particular to an organic light emitting diode (OLED) display panel and an electronic device.

BACKGROUND

Mobile phones are one of the indispensable products in people's daily lives. Presently, mobile phones using flexible organic light emitting diode (OLED) display panels have an advantage of being foldable. However, as flexible polymer substrate of flexible OLED display panels has poor moisture and oxygen barrier properties, the organic light emitting diode OLED layer and the active cathode in the OLED are easily corroded, resulting in shortened service life of mobile phones.

Therefore, it is necessary to provide a technical solution to solve the problem of shortened service life of mobile phones due to poor moisture and oxygen barrier properties of the flexible polymer substrate of the flexible OLED display panel.

SUMMARY

The purpose of the present application is to provide an organic light emitting diode (OLED) display panel and an electronic device, which have good performance in blocking moisture and oxygen.

To achieve the above purpose, the present application provides an electronic device comprising an organic light emitting diode (OLED) display panel. The OLED display panel comprises a flexible polymer substrate, a first inorganic layer, a second inorganic layer, and an organic light emitting diode (OLED) array layer. The first inorganic layer and the second inorganic layer are formed over opposite surfaces of the flexible polymer substrate, and the OLED array layer is formed on a side of the first inorganic layer away from the flexible polymer substrate.

In the above electronic device, the organic light emitting diode display panel further comprises an organic layer formed on a side of the second inorganic layer away from the flexible polymer substrate.

In the above electronic device, the OLED display panel comprises at least one photosensitive region, and the photosensitive region of the OLED display panel is formed with a recess, and the recess penetrates a portion of the organic layer along a first direction in which a direction that the organic layer facing the flexible polymer substrate.

In the above electronic device, the recess penetrates through the entire organic layer along the first direction, or the recess penetrates through the entire organic layer and a portion of the second inorganic layer along the first direction.

In the above electronic device, the electronic device further comprises an optical sensor disposed in the recess, and the optical sensor having a size along the first direction that is less than or equal to a depth of the recess along the first direction.

In the above electronic device, the OLED display panel further comprises a display region, and the display region is disposed at a periphery of the photosensitive region or the photosensitive region overlaps the display region.

In the above electronic device, the flexible polymer substrate and the organic layer are both polyimide layers, and the polyimide layer has a light transmittance greater than or equal to 90%.

In the above electronic device, the second inorganic layer comprises a stacked layer of a first silicon oxide layer and an amorphous silicon layer, and the amorphous silicon layer is disposed between the first silicon oxide layer and the organic layer.

In the above electronic device, the polyimide layer is formed by imidizing a polyamic acid solution in a heating chamber after coating the polyamic acid solution, and an oxygen volume content in the heating chamber is less than or equal to 100 ppm.

In the above electronic device, the first inorganic layer comprises a stacked layer of at least one silicon oxide layer and at least one silicon nitride layer, and the second silicon oxide layer is located on one side adjacent to the flexible polymer substrate.

An organic light emitting diode (OLED) display panel, comprising a flexible polymer substrate; a first inorganic layer; a second inorganic layer; and an organic light emitting diode (OLED) array layer. The first inorganic layer and the second inorganic layer are formed on opposite surfaces of the flexible polymer substrate, and the OLED array layer is formed on a side of the first inorganic layer away from the flexible polymer substrate.

In the above OLED display panel, the OLED display panel further comprises an organic layer formed on one side of the second inorganic layer away from the flexible polymer substrate.

In the above OLED display panel, the OLED display panel further comprises at least one photosensitive region, and the photosensitive region of the OLED display panel is formed with a recess. The recess penetrates at least a portion of the organic layer along a first direction in which a direction that the organic layer facing the flexible polymer substrate.

In the above OLED display panel, the recess penetrates the entire organic layer along the first direction, or the recess penetrates the entire organic layer and a portion of the second inorganic layer along the first direction.

In the above OLED display panel, the OLED display panel further comprises a display region, wherein the display region is disposed at a periphery of the photosensitive region, or the photosensitive region overlaps the display region.

In the above OLED display panel, the flexible polymer substrate and the organic layer are both polyimide layers, and the polyimide layer has a transmittance greater than or equal to 90%.

In the above OLED display panel, the polyimide layer is formed by imidizing a polyamic acid solution in a heating chamber after the polyamic acid solution is coated, and an oxygen volume content in the heating chamber is less than or equal to 100 ppm.

In the above OLED display panel, the second inorganic layer comprises a stacked layer of a first silicon oxide layer and an amorphous silicon layer, and the amorphous silicon layer is disposed between the first silicon oxide layer and the organic layer.

In the above OLED display panel, the first inorganic layer comprises a stacked layer of at least one silicon oxide layer and at least one silicon nitride layer, wherein the second silicon oxide layer is located on one side adjacent to the flexible polymer substrate.

The present application provides an organic light emitting diode (OLED) display panel and an electronic device. The OLED display panel comprises a flexible polymer substrate, a first inorganic layer, a second inorganic layer, and an organic light emitting diode (OLED) array layer; the first inorganic layer and the second inorganic layer formed over opposite surfaces of the flexible polymer substrate, and the organic light emitting diode array layer formed on a side of the first inorganic layer away from the flexible polymer substrate. Through respectively forming an inorganic layer on opposite surfaces of the flexible polymer substrate, the flexible polymer substrate and the inorganic layer on the opposite surfaces thereof as a whole have high barrier properties against moisture and oxygen. Moisture and oxygen can be prevented from corroding active cathode and organic light emitting layer of the OLED array layer, thereby improving the service life of the organic light emitting diode display panel and the electronic device.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a schematic plan view of an electronic device according to a first embodiment of the present application.

FIG. **2** is a first cross-sectional view along line A-A of the electronic device shown in FIG. **1**.

FIG. **3** is a second cross-sectional view along line A-A of the electronic device shown in FIG. **1**.

FIG. **4** is a third cross-sectional view along line A-A of the electronic device shown in FIG. **1**.

FIG. **5** is a fourth cross-sectional view along line A-A of the electronic device shown in FIG. **1**.

FIG. **6** is a schematic plan view of an electronic device according to a second embodiment of the present application.

FIG. **7** is a schematic plan view of an electronic device according to a third embodiment of the present application.

FIG. **8** is a schematic plan view of an electronic device according to a fourth embodiment of the present application.

DETAILED DESCRIPTION

In order to clearly and completely illustrate technical solutions in embodiments of the present invention, the following description will refer to the drawings in the embodiments of the present invention. Obviously, the described embodiments are only a part of the embodiments of the present invention, and not all the embodiments. All other embodiments obtained by a person skilled in the art based on the embodiments of the present invention without creative efforts are within the scope of the present invention.

Referring to FIG. **1** and FIG. **2**, FIG. **1** is a schematic plan view of an electronic device according to a first embodiment of the present application, and FIG. **2** is a first cross-sectional view along a line A-A of the electronic device shown in FIG. **1**. The electronic device **100** is a smart mobile terminal. The electronic device **100** comprises an organic light emitting diode (OLED) display panel **10** and an optical sensor **20**. The optical sensor **20** comprises a camera, an infrared (IR) sensor, a distance sensor, a fingerprint recognition sensor, and the like. The OLED display panel **10** comprises a flexible polymer substrate **101**, a first inorganic layer **102**, a second inorganic layer **103**, and an OLED array layer **104**.

The first inorganic layer **102** and the second inorganic layer **103** are formed over opposite surfaces of the flexible polymer substrate **101**. The OLED array layer **104** is formed on a side of the first inorganic layer **102** away from the flexible polymer substrate **101**. The first inorganic layer **102** and the second inorganic layer **103** have good compactness to block moisture and oxygen, and the flexible polymer substrate **101** has good flexibility. The first inorganic layer **102**, the second inorganic layer **103**, and the flexible polymer substrate **101** as a whole has good flexibility and barrier property, and can thus prevent active cathode and organic light emitting material of the OLED array layer from corrosion caused by moisture and oxygen to improve the service life of the electronic device.

The flexible polymer substrate **101** supports the organic light emitting diode array layer **104**. The flexible polymer substrate **101** is a polyimide (PI) layer. The polyimide layer has a light transmittance of greater than or equal to 90%. The polyimide layer is typically formed by imidizing a polyamic acid solution in a heating chamber after the polyamic acid solution is coated. A volume percentage of oxygen in the heating chamber is less than or equal to 100 ppm to make a light transmittance of the formed polyimide layer be greater than or equal to 90%, and prevent the formed polyimide layer from turning yellow and causing low light transmittance, thereby affecting the receiving effect on optical signals of the optical sensor **20** at a side of the flexible polymer substrate **101**. That is, once light transmittance of the polyimide layer is greater than or equal to 90%, it is advantageous for improving the reception of the optical signals by the optical sensor **20**. Furthermore, during formation of polyimide by imidizing the polyamic acid, a temperature of the heating chamber is raised from 120° C. to 450° C. after a first period of time, and is maintained at 450° C. for a second period of time, and is cooled down to 120° C. for a third period of time.

The first inorganic layer **102** comprises a stacked layer of at least one second silicon oxide layer **1021** and at least one silicon nitride layer **1022**, and the second silicon oxide layer **1021** is located on a side close to the flexible polymer substrate **101**. Specifically, the first inorganic layer **102** is a stacked layer of the second silicon oxide layer **1021** and the silicon nitride layer **1022**, and the second silicon oxide layer **1021** is located on the side close to the flexible polymer substrate **101** to block moisture and oxygen and increase adhesion between the first inorganic layer **102** and the flexible polymer substrate **101** at the same time. In addition, the silicon nitride layer **1022** has a better performance for blocking moisture and oxygen than the second silicon oxide layer **1021** to further prevent moisture and oxygen from passing through the first inorganic layer **102** and reaching the OLED array layer **104**. The first inorganic layer **102** is a stacked layer of at least one silicon oxide layer **1021** and at least one silicon nitride layer **1022**, so that the first inorganic layer **102** can adhere well to the flexible polymer substrate **101** and perform well for blocking moisture and oxygen at the same time, thereby preventing moisture and oxygen from passing through the first inorganic layer **102** and corroding the active cathode and organic light emitting materials of the OLED array layer **104**.

The second inorganic layer **103** can be made of silicon oxide, silicon nitride, aluminum oxide, and other inorganic materials for blocking moisture and oxygen from entering the flexible polymer substrate **101**.

More specifically, the OLED display panel **10** further comprises an organic layer **105**. The organic layer **105** is formed on a side of the second inorganic layer **103** away from the flexible polymer substrate **101**. Through formation of the organic layer **105** on the side of the first inorganic layer **10** away from the flexible polymer substrate **1012**, a path for diffusing the moisture and oxygen to the OLED array layer **104** is increased. The first inorganic layer **102**, the flexible polymer substrate **101**, the second inorganic layer **103**, and the organic layer **105** as a whole further improves the barrier property of the OLED display panel **10** against moisture and oxygen. The organic layer **105** is a polyimide (PI) layer. The polyimide layer has a light transmittance of greater than or equal to 90%. The polyimide layer is typically formed by imidizing a polyamic acid solution in a heating chamber after the polyamic acid solution is coated. A volume percentage of oxygen in the heating chamber is less than or equal to 100 ppm to make a light transmittance of the formed polyimide layer be greater than or equal to 90% and prevent the formed polyimide layer from turning yellow and causing low light transmittance, thereby affecting the receiving effect on optical signals of the optical sensor **20** at the side of the flexible polymer substrate **101**. That is, once light transmittance of the polyimide layer is greater than or equal to 90%, it is advantageous for improving the reception of the optical signals by the optical sensor **20**.

The second inorganic layer **103** comprises a stacked layer of a first silicon oxide layer **1031** and an amorphous silicon (α-Si) layer **1032**. The amorphous silicon layer **1032** is disposed between the first silicon oxide **1031** and the organic layer **105**. The first silicon oxide layer **1031** has a thickness of 450 nm to 550 nm. The first silicon oxide layer **1031** and the amorphous silicon layer **1032** both block moisture and oxygen, and the amorphous silicon layer **1032** further improves adhesion between the second inorganic layer **103** and the organic layer **105** at the same time.

Furthermore, the second inorganic layer **103** further comprises a silicon nitride layer (not shown) formed between the first silicon oxide layer **1031** and the amorphous silicon layer **1032** to further enhance blocking performance of the second inorganic layer **103** against moisture and oxygen, thereby further improving the barrier function of the OLED display panel **10** against moisture and oxygen.

The OLED array layer **104** comprises a plurality of organic light emitting diodes arranged in an array. The organic light emitting diodes comprise an anode, a cathode, and an organic light emitting material between the anode and the cathode. The organic light emitting material and the active metal in the cathode are sensitive to moisture and oxygen, and are easily corroded, resulting in malfunction of the organic light-emitting diodes and shortened service life of the electronic device.

The OLED display panel **10** further comprises an encapsulation layer **106**. The encapsulation layer **106** is used to encapsulate the OLED array layer **104** to prevent the OLED array layer **104** from contacting with moisture and oxygen, which leads to shortened service life of the organic light emitting diode display panel and decreased service life of the electronic device. The encapsulation layer **106** comprises at least two inorganic layers and one organic layer between the two inorganic layers.

Referring to FIGS. **1** and **2** again, the OLED display panel **10** comprises at least one photosensitive region **100***a*. The photosensitive region **100***a* is used to dispose the optical sensor **20**, and the optical sensor **20** receives optical signals and converts them into electrical signals after light is incident on the photosensitive region **100***a*. The OLED display panel **10** further comprises a display region **100***b* disposed at the periphery of the photosensitive region **100***a*. Specifically, there are a plurality of photosensitive regions **100***a*, and the plurality of photosensitive regions **100***a* are independent from each other, and the display region **100***b* is located at the periphery of the plurality of photosensitive regions **100***a*. A plurality of photosensitive regions **100***a* are located at one end of the OLED display panel **10**. A shape of the plurality of photosensitive regions **100***a* is a circle, square, or other shapes. The optical sensor **20** is disposed in the photosensitive region **100***a* of the OLED display panel **10**, and is disposed on a side of the organic layer **105** away from the flexible polymer substrate **101**. Each of the photosensitive regions **100***a* is correspondingly disposed with at least one optical sensor **20**. A vertical projection of the optical sensor **20** over the flexible polymer substrate **101** is within or overlaps the photosensitive region **100***a*.

It should be noted that the photosensitive region **100***a* of the OLED display panel **10** is a light transmitting region to ensure that an external light signal can reach the optical sensor **20**. The photosensitive region **100***a* of the OLED display panel **10** is formed as a light-transmissive region by forming a hole in a film layer of the photosensitive region **100***a*. For example, the OLED array layer **104** of the photosensitive region **100***a* is removed to form a hole to prevent the optical signal from not being able to reach the optical sensor **20** due to light shielding of a metal layer in the OLED array layer **104**.

Please refer to FIG. **3**, which is a second cross-sectional view along the line A-A of the electronic device shown in FIG. **1**. As shown in FIG. **3**, the photosensitive region **100***a* of the OLED display panel **10** is provided with a recess **100***c* that penetrates at least a portion of the organic layer **105** along a first direction. The first direction is a direction of the organic layer **105** toward the flexible polymer substrate **101**. The optical sensor **20** is disposed in the recess **100***c*, and a size of the optical sensor **20** along the first direction may be greater than the depth of the recess **100***c* along the first direction. In addition, the size of the optical sensor **20** along the first direction is less than or equal to the depth of the recess **100***c* along the first direction. More specifically, the recess **100***c* penetrates the portion of the organic layer **105** along the first direction, and the recess **100***c* is used to place the optical sensor **20**, so that a height of the optical sensor **20** protruding over the OLED display panel **10** is thus reduced, thereby reducing the unevenness of the electronic device due to setting of the optical sensor **20**, making the side where the optical sensor **20** receives the optical signal closer to the light incident surface of the OLED display panel **10**, and allowing the optical sensor **20** to receive more optical signals due to reduction of the path that light passes to the optical sensor **20**. A thickness of the recess **100***c* penetrating the organic layer **105** along the first direction depends on the size of the optical sensor **20**.

Please refer to FIG. **4**, which is a third cross-sectional view along the line A-A of the electronic device shown in FIG. **1**. As shown in FIG. **4**, the recess **100***c* may penetrate the entire organic layer **105** along the first direction to further reduce the unevenness of the electronic device due to disposing of the optical sensor **20** on the light-emitting backside surface of the OLED display panel **10**, and further improve the optical signal receiving performance of the optical sensor **20**.

Please refer to FIG. **5**, which is a fourth cross sectional view along the line A-A of the electronic device shown in FIG. **1**. The recess **100***c* penetrates the entire organic layer **105** and a portion of the second inorganic layer **103** along the first direction. More specifically, when the second inorganic layer is formed of the first silicon oxide layer **1031** and an amorphous silicon layer **1032** and the amorphous silicon layer **1032** is between the first silicon oxide layer **1031** and the organic layer **105**, the recess **100***c* penetrates the entire organic layer **105** and the amorphous silicon layer **1032** in the second inorganic layer **103** along the first direction to ensure that the OLED display panel **10** can block moisture and oxygen and further reduce unevenness in the electronic device due to disposing of the optical sensor **20** on the light emitting backside surface of the OLED display panel **10**.

When the second inorganic layer **103** is formed of the first silicon oxide layer **1031**, the amorphous silicon layer **1032**, and the silicon nitride between the first silicon oxide **1031** and the amorphous silicon **1032**, and the amorphous silicon layer **1032** is located on the side close to the organic layer **105**, the recess **100***c* penetrates the entire organic layer **105** and the amorphous silicon layer **1032** and the silicon nitride layer in the second inorganic layer **103** along the first direction.

Please refer to FIG. **6**, which is a schematic plan view of an electronic device according to a second embodiment of the present application. The electronic device **100** shown in FIG. **6** is basically similar to the electronic device **100** shown in FIG. **1**, except that a photosensitive region **100***a* is disposed at one end of an OLED display panel **10**, there is one photosensitive region **100***a*, the photosensitive region **100***a* is U-shaped, and a display region **100***b* is located at a periphery of the photosensitive region **100***a*. A plurality of optical sensors **20** are disposed in the photosensitive region **100***a*. The photosensitive region **100***a* of the OLED display panel **10** is formed with a recess **100***c*, and a vertical projection of the recess **100***c* on a flexible polymer substrate **101** exactly overlaps the photosensitive region **100***a*. The recess **100***c* penetrates at least a portion of an organic layer **105** along a direction in which the organic layer **105** faces the flexible polymer substrate **101**.

Please refer to FIG. **7**, which is a schematic plan view of an electronic device according to a third embodiment of the present application. An electronic device **100** shown in FIG. **7** is basically similar to the electronic device **100** shown in FIG. **1**, except that a photosensitive region **100***a* completely overlaps a display region **100***b*, and an optical sensor **20** is disposed at one end of an OLED display panel **10** and is located in a photosensitive region **100***a*. The photosensitive region **100***a* of the OLED display panel **10** is formed with a recess **100***c* penetrating at least a portion of an organic layer **105** along a direction in which the organic layer **105** faces a flexible polymer substrate **101**. The recess **100***c* is disposed with a camera and an infrared sensor, or the like therein. A plurality of touch elements is further disposed in the recess **100***c*. The touch elements may be infrared light emitting and receiving sensing elements, and the touch elements may also be ultrasonic transmitters and corresponding ultrasonic receivers, so that the display region **100***b* of the electronic device **100** has display function, touch function and light transmission function. The photosensitive region **100***a* of the OLED display panel **10** is formed with the recess **100***c*, and a vertical projection of the recess **100***c* on the flexible polymer substrate **101** exactly overlaps the photosensitive region **100***a*.

Please refer to FIG. **8**, which is a schematic plan view of an electronic device according to a fourth embodiment of the present application. An electronic device **100** shown in FIG. **8** is basically similar to the electronic device **100** shown in FIG. **7**, except that a photosensitive region **100***a* partially overlaps a display region **100***b*, and the photosensitive region **100***a* is disposed in the display region **100***b*, that is, the display region **100***b* is larger than the photosensitive region **100***a*.

Based on the same inventive concept, the present application further provides an organic light emitting diode display panel comprising a flexible polymer substrate, a first inorganic layer, a second inorganic layer, and an organic light emitting diode array layer; the first inorganic layer and the second inorganic layer formed over opposite surfaces of the flexible polymer substrate, and the organic light emitting diode array layer formed on a side of the first inorganic layer away from the flexible polymer substrate.

The organic light emitting diode display panel of the present application respectively forms an inorganic layer on opposite surfaces of the flexible polymer substrate, and the flexible polymer substrate and the inorganic layer on the opposite surfaces thereof as a whole have high barrier properties against moisture and oxygen. Moisture and oxygen can be prevented from corroding active cathode and the organic light emitting layer of the organic light emitting diode array layer, thereby improving the service life of the organic light emitting diode display panel.

While the present disclosure has been described with the aforementioned preferred embodiments, it is preferable that the above embodiments should not be construed as limiting of the present disclosure. Anyone having ordinary skill in the art can make a variety of modifications and variations without departing from the spirit and scope of the present disclosure as defined by the following claims.

What is claimed is:

1. An electronic device, comprising an organic light emitting diode (OLED) display panel, wherein the OLED display panel comprises a flexible polymer substrate, a first inorganic layer, a second inorganic layer, an organic layer, and an OLED array layer; and

the first inorganic layer and the second inorganic layer formed over opposite surfaces of the flexible polymer substrate, the organic layer is formed on a side of the second inorganic layer away from the flexible polymer substrate, and the OLED array layer formed on a side of the first inorganic layer away from the flexible polymer substrate; and

wherein the first inorganic layer comprises a stacked layer of at least one second silicon oxide layer and at least one silicon nitride layer, and the at least one second silicon oxide layer located on one side adjacent to the flexible polymer substrate; and

the second inorganic layer comprises a stacked layer of a first silicon oxide layer and an amorphous silicon layer, and the amorphous silicon layer disposed between the first silicon oxide layer and the organic layer.

2. The electronic device of claim **1**, wherein the OLED display panel comprises at least one photosensitive region, the at least one photosensitive region of the OLED display panel formed with a recess, and the recess penetrates a portion of the organic layer along a first direction that is a direction in which the organic layer faces the flexible polymer substrate.

3. The electronic device of claim **2**, wherein the recess penetrates through entire organic layer along the first direction, or the recess penetrates through the entire organic layer and a portion of the second inorganic layer along the first direction.

4. The electronic device of claim **2**, wherein the electronic device further comprises an optical sensor disposed in the recess, and the optical sensor has a size along the first direction that is less than or equal to a depth of the recess along the first direction.

5. The electronic device of claim **2**, wherein the OLED display panel further comprises a display region, and the display region is disposed at a periphery of the photosensitive region, or the photosensitive region overlaps the display region.

6. The electronic device of claim 1, wherein the flexible polymer substrate and the organic layer are both polyimide layers, and the polyimide layers have a light transmittance greater than or equal to 90%.

7. The electronic device of claim 6, wherein the polyimide layers are formed by imidizing a polyamic acid solution in a heating chamber after coating the polyamic acid solution, and a volume percentage of oxygen in the heating chamber is less than or equal to 100 ppm.

8. An organic light emitting diode (OLED) display panel, comprising:

a flexible polymer substrate;

a first inorganic layer;

a second inorganic layer;

an organic layer; and

an OLED array layer;

wherein the first inorganic layer and the second inorganic layer formed on opposite surfaces of the flexible polymer substrate, the organic layer is formed on a side of the second inorganic layer away from the flexible polymer substrate, and the OLED array layer formed on a side of the first inorganic layer away from the flexible polymer substrate,

wherein the first inorganic layer comprises a stacked layer of at least one second silicon oxide layer and at least one silicon nitride layer, wherein the at least one second silicon oxide layer located on one side adjacent to the flexible polymer substrate; and

the second inorganic layer comprises a stacked layer of a first silicon oxide layer and an amorphous silicon layer, and the amorphous silicon layer disposed between the first silicon oxide layer and the organic layer.

9. The OLED display panel of claim 8, further comprising at least one photosensitive region, and the at least one photosensitive region of the OLED display panel formed with a recess, and the recess penetrates at least a portion of the organic layer along a first direction that is a direction in which the organic layer faces the flexible polymer substrate.

10. The OLED display panel of claim 9, wherein the recess penetrates the entire organic layer along the first direction, or the recess penetrates the entire organic layer and a portion of the second inorganic layer along the first direction.

11. The OLED display panel of claim 9, further comprising a display region, wherein the display region is disposed at a periphery of the photosensitive region, or the photosensitive region overlaps the display region.

12. The OLED display panel of claim 8, wherein the flexible polymer substrate and the organic layer are both polyimide layers, and the polyimide layers have a transmittance greater than or equal to 90%.

13. The OLED display panel of claim 12, wherein the polyimide layers are formed by imidizing a polyamic acid solution in a heating chamber after the polyamic acid solution is coated, and a volume percentage of oxygen in the heating chamber is less than or equal to 100 ppm.

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